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Cuddeback et al.

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(54) **AUTOMATED CAMERA ASSEMBLY WITH INFRARED DETECTOR CURTAIN**

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H04N 7/18	(2006.01)
H04N 5/33	(2006.01)
G03B 7/099	(2014.01)
G03B 13/00	(2006.01)
G03B 17/38	(2006.01)

(Continued)

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CPC ***H04N 7/188*** (2013.01); ***G03B 5/00*** (2013.01); ***G03B 17/38*** (2013.01); ***G08B 13/19652*** (2013.01); ***H04N 5/2254*** (2013.01); ***H04N 5/33*** (2013.01); *H04N 5/23222* (2013.01)

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USPC 348/151, 157, 158, 164, 152, 155, 154, 348/369; 396/274, 263, 427, 433; 250/347; 340/541

See application file for complete search history.

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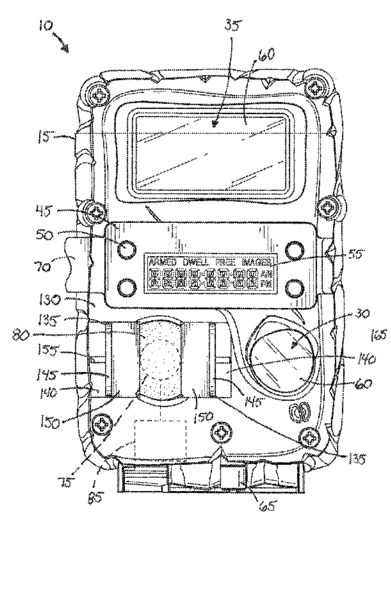
(57) **ABSTRACT**

The present invention provides an automated camera assembly comprising a camera (e.g., a digital camera) having a field of vision and a detector for detecting a subject and triggering the camera. The detector has an adjustable field of view and includes a sensor (e.g., an IR sensor) having a maximum field of view, and a curtain for reducing the maximum field of view to an adjusted field of view. The curtain comprises at least two sections (e.g., opaque members) coupled to move together from a first position corresponding with the maximum field of view to a second position corresponding with the adjusted field of view smaller than the maximum field of view. Movement of the curtain relative to the sensor can be linear, pivotal, radial, or any other suitable movement.

11 Claims, 9 Drawing Sheets



(51) **Int. Cl.**

G08B 13/196	(2006.01)
G03B 5/00	(2006.01)
H04N 5/225	(2006.01)
H04N 5/232	(2006.01)

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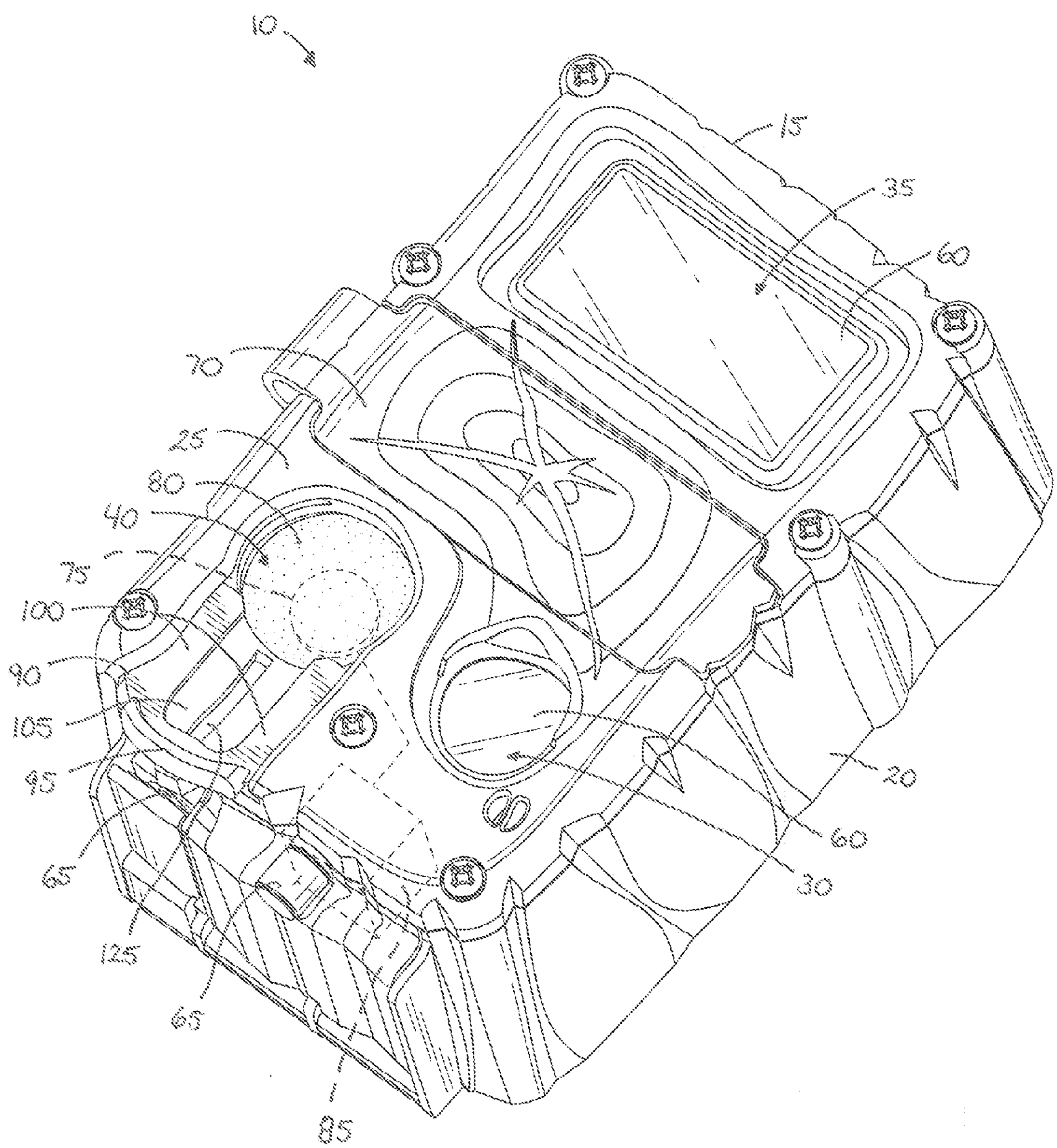

FIG. 1

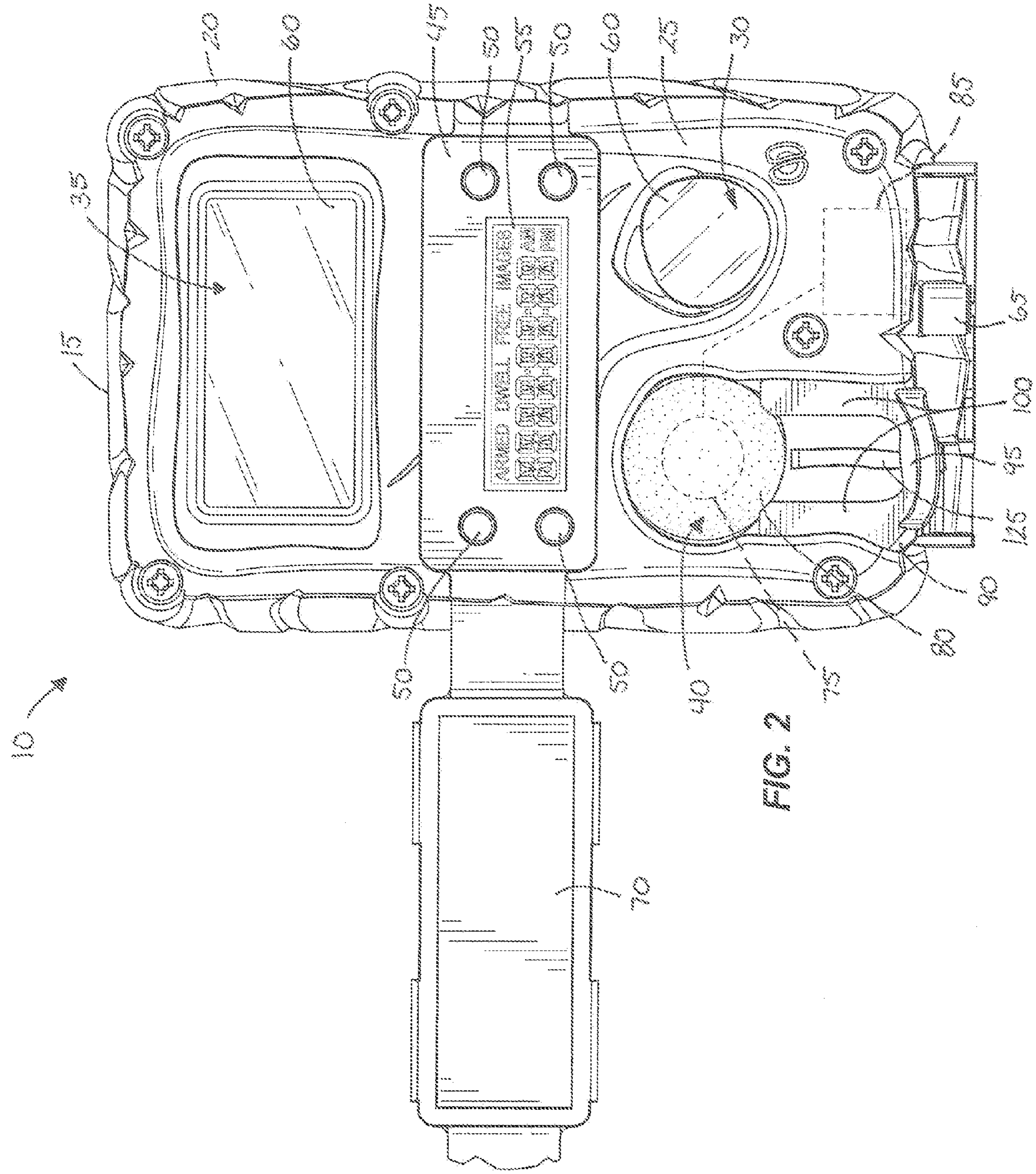
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FIG. 2

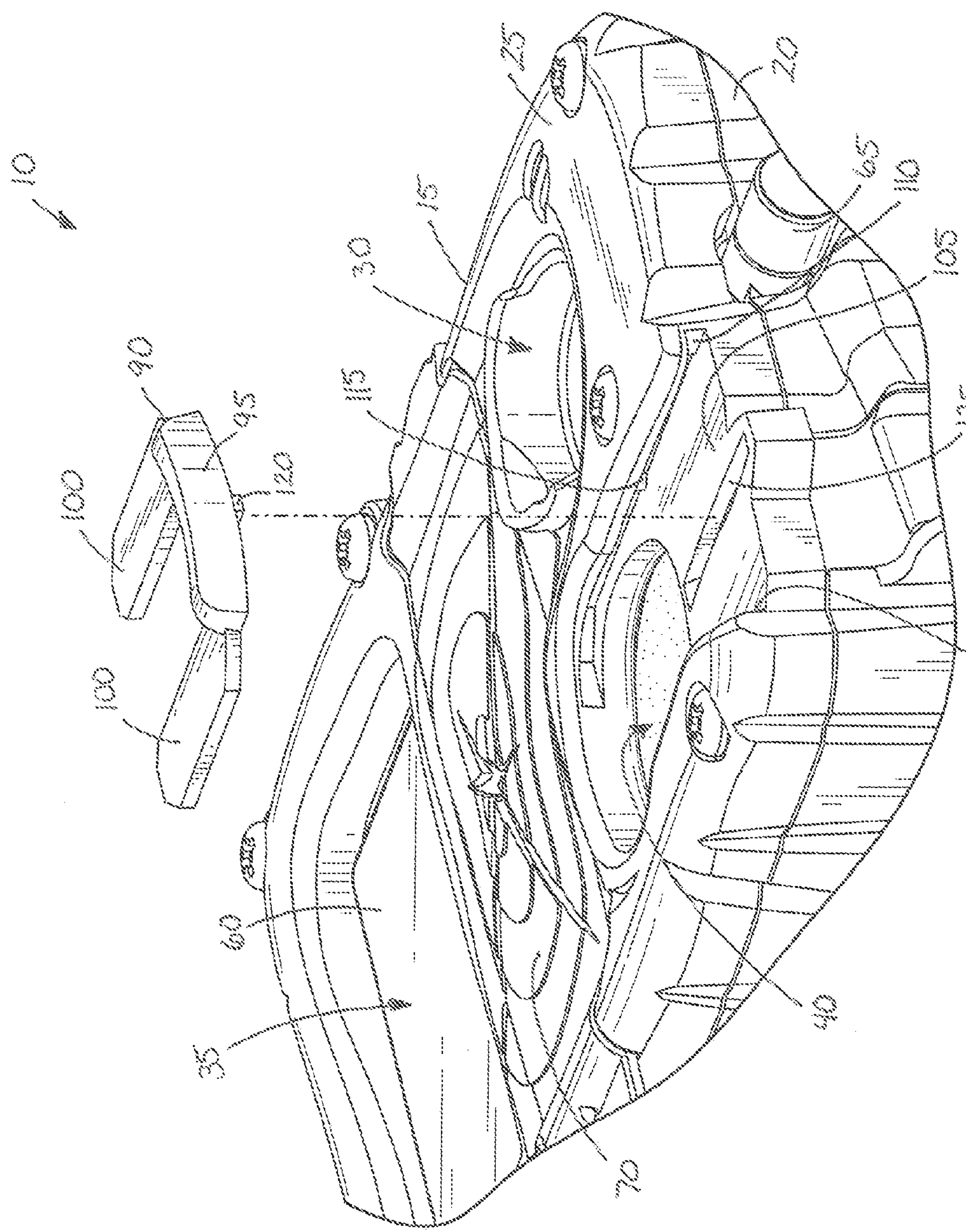

FIG. 3

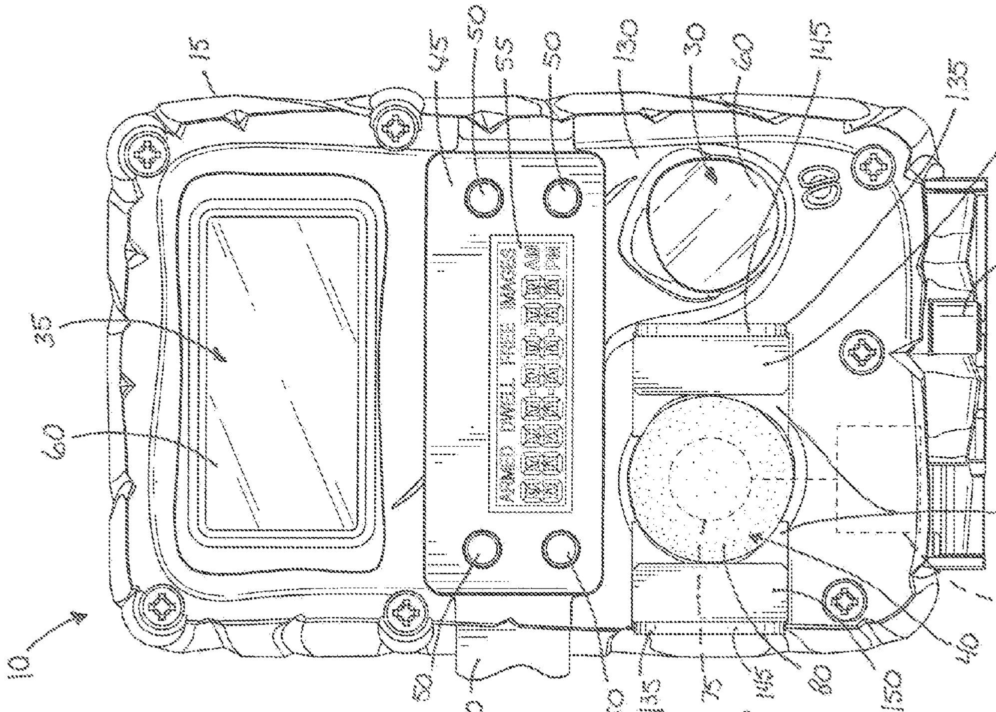

FIG. 5

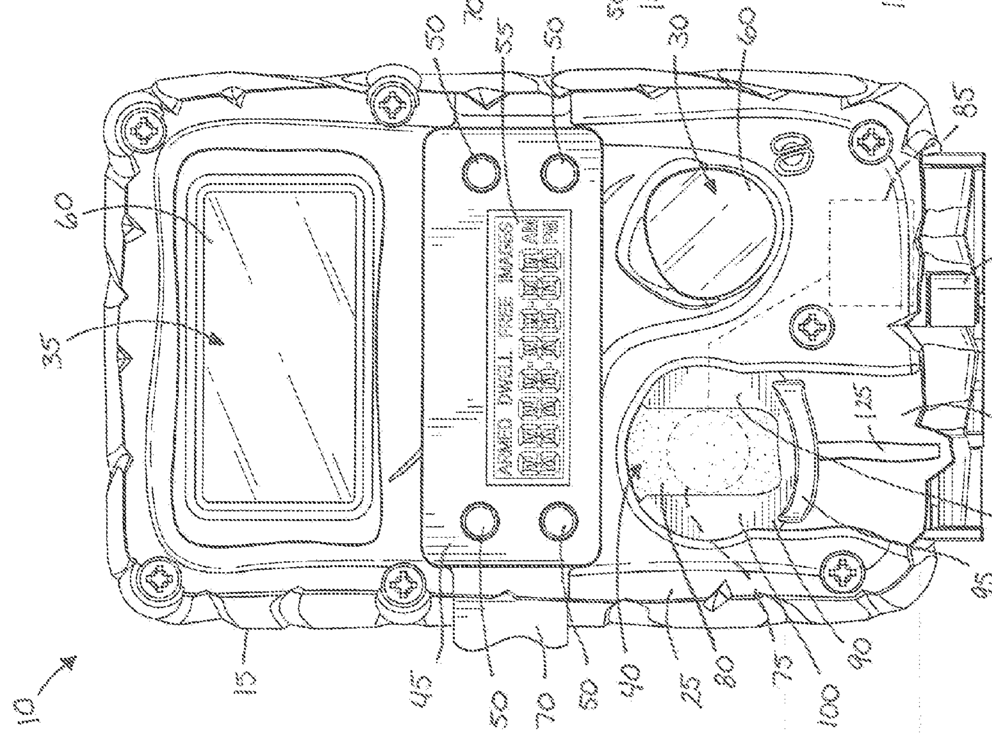

FIG. 4

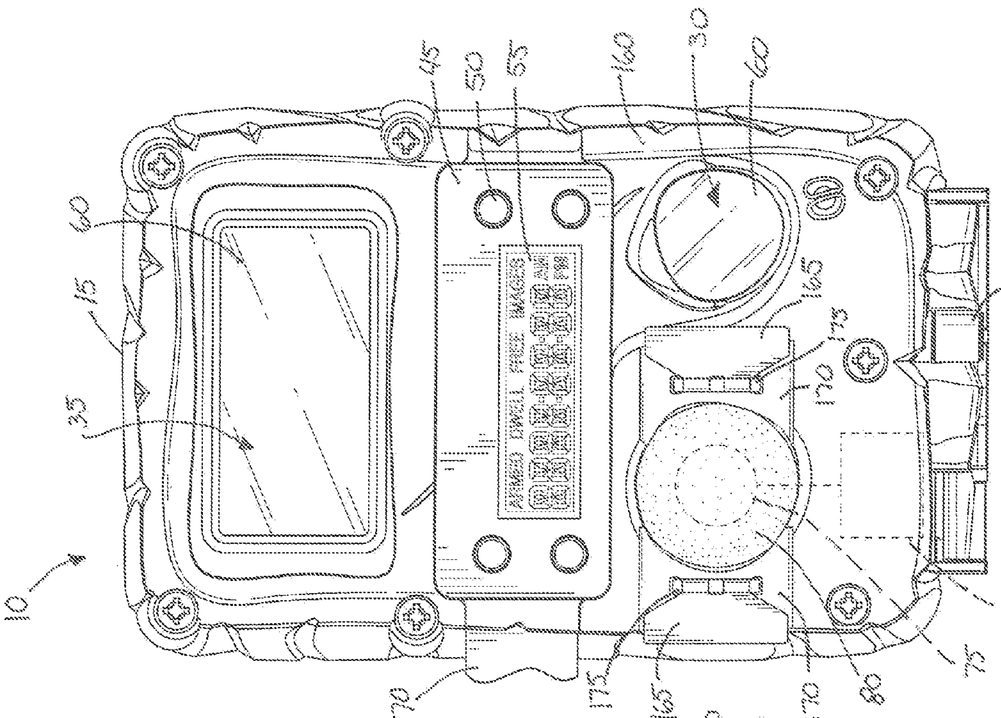

FIG. 7

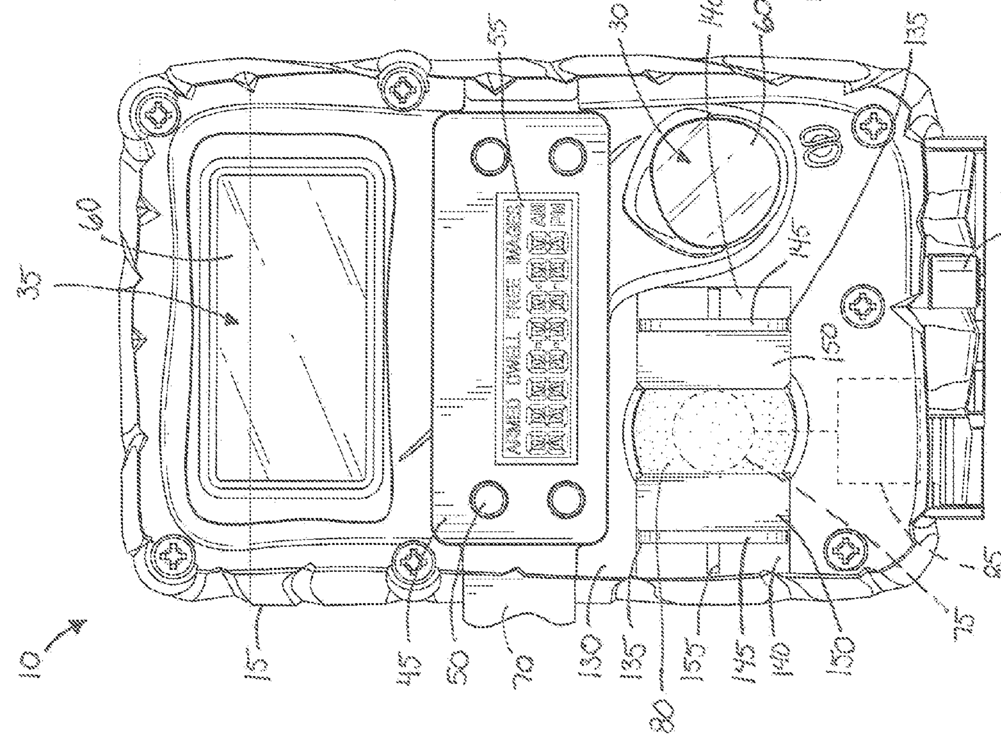

FIG. 6

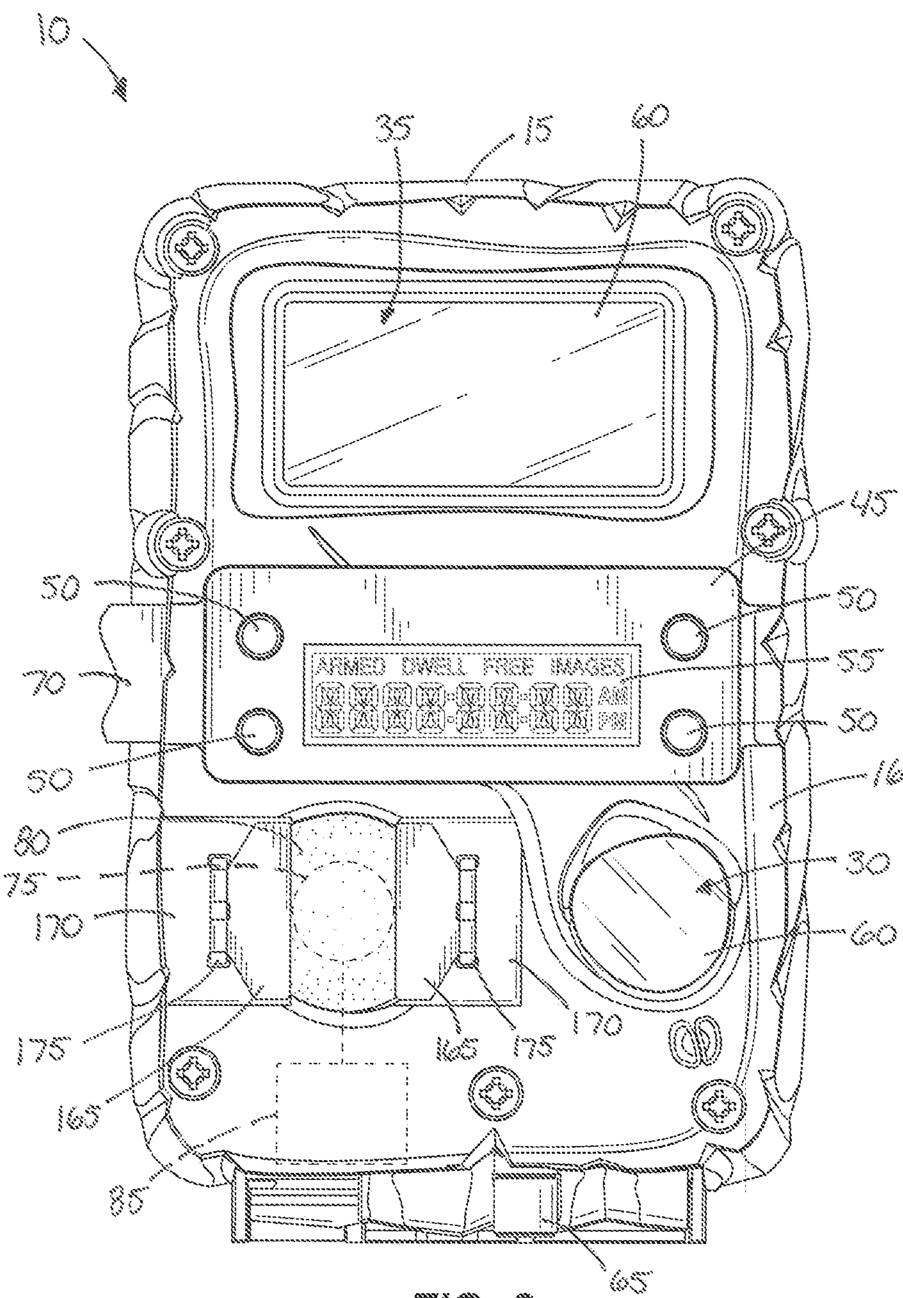
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FIG. 8

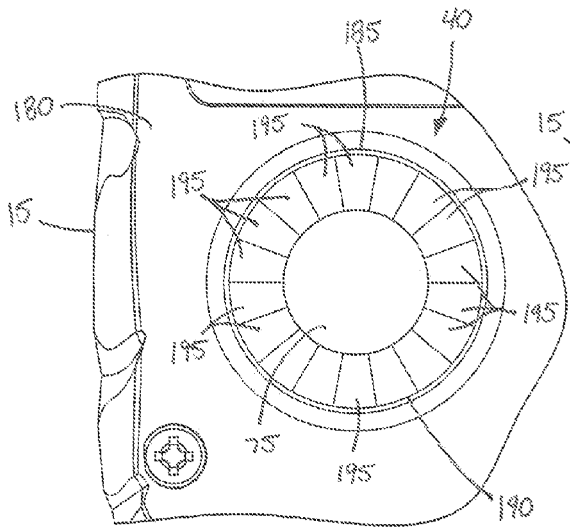

FIG. 9

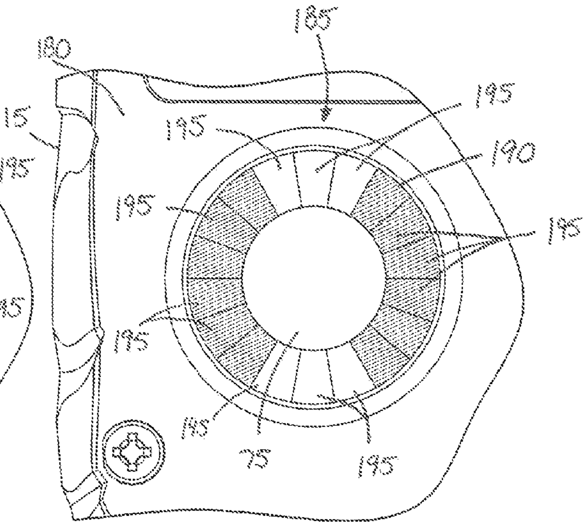

FIG. 10

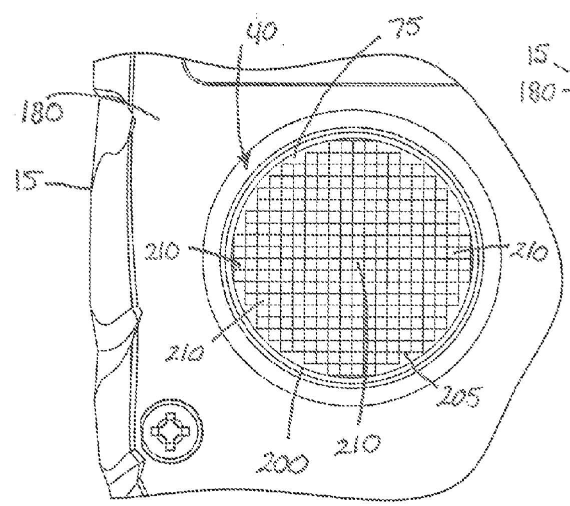

FIG. 11

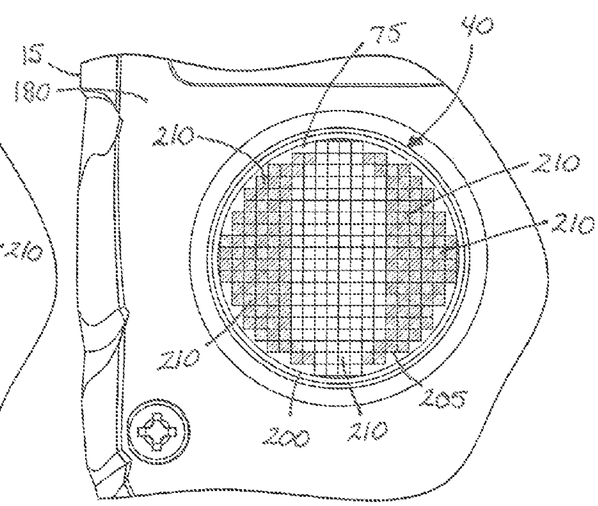

FIG. 12

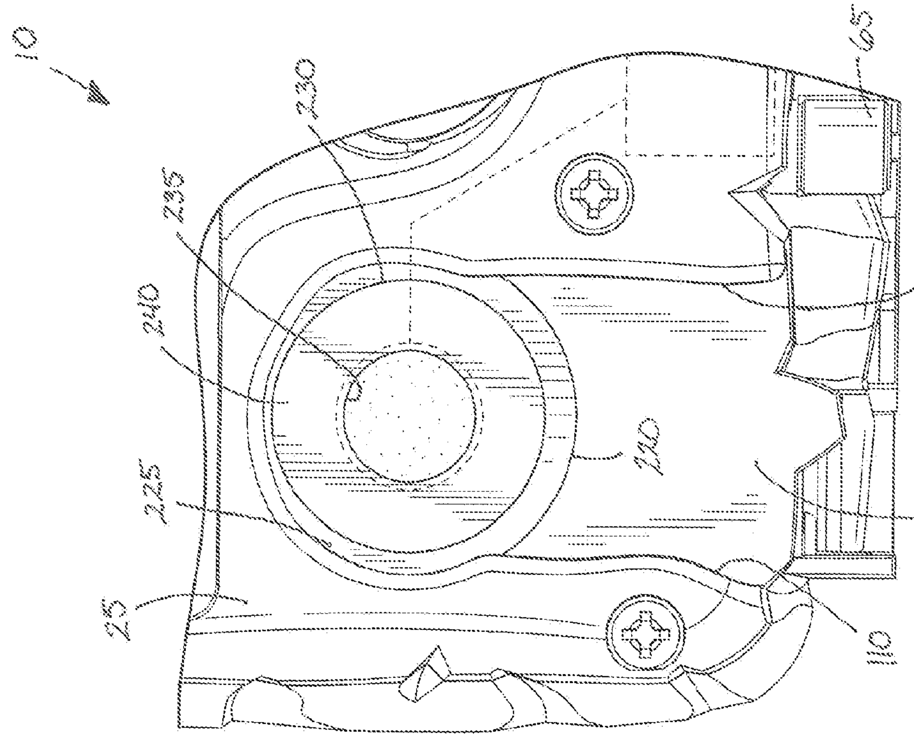

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FIG. 14

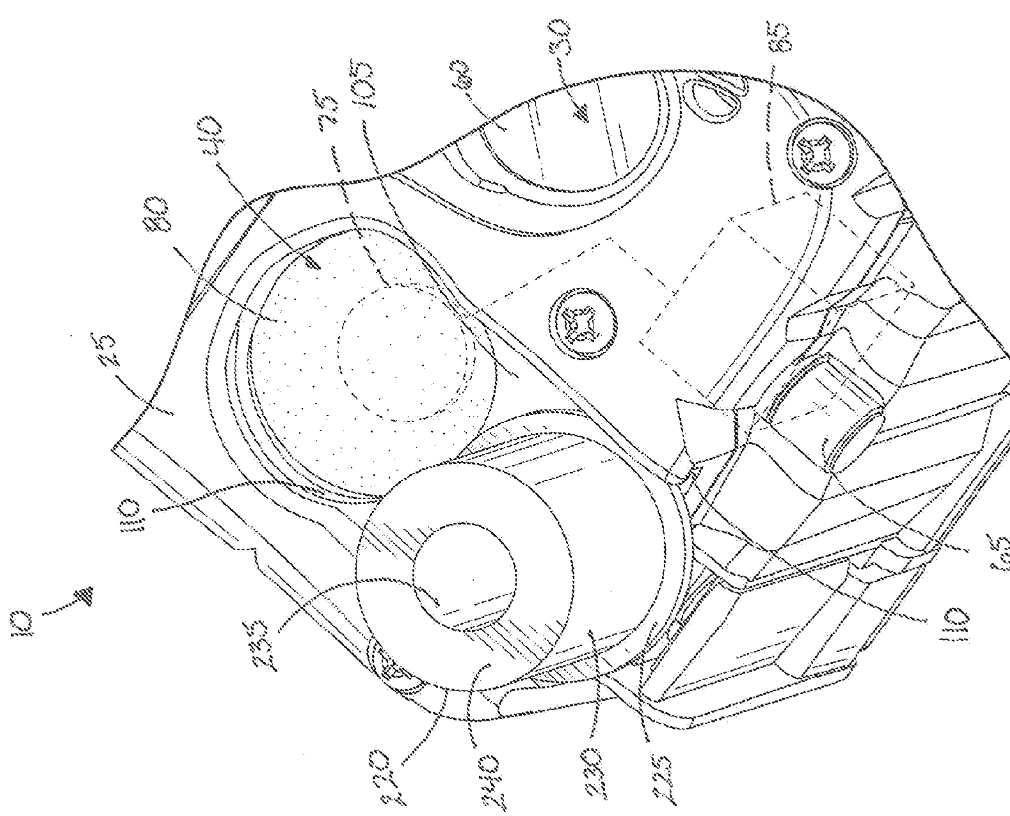

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FIG. 13

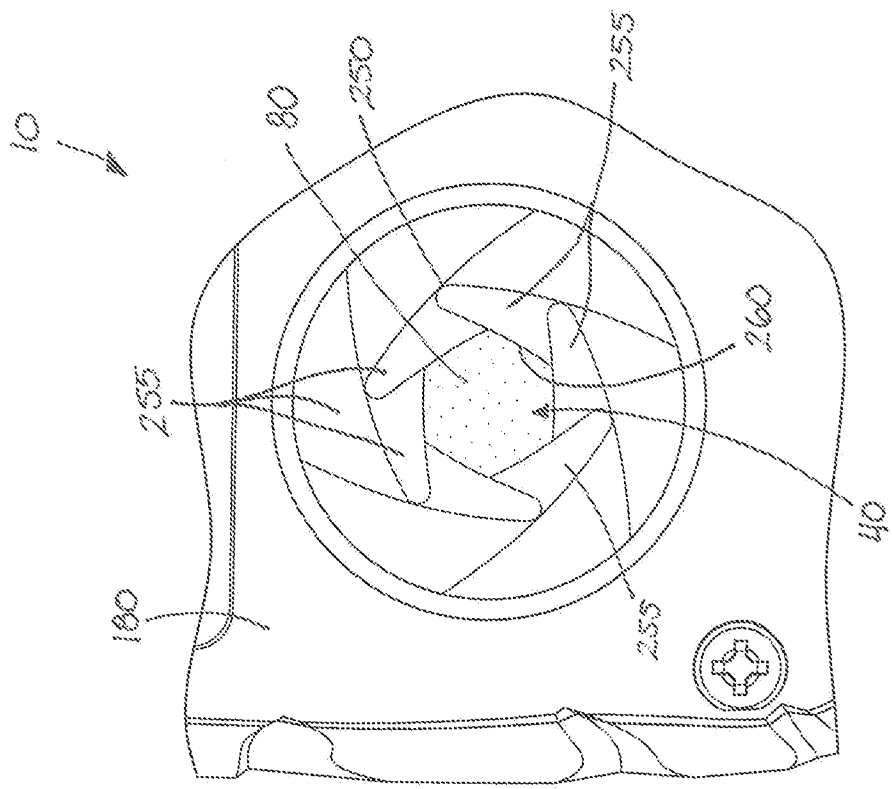
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FIG. 16

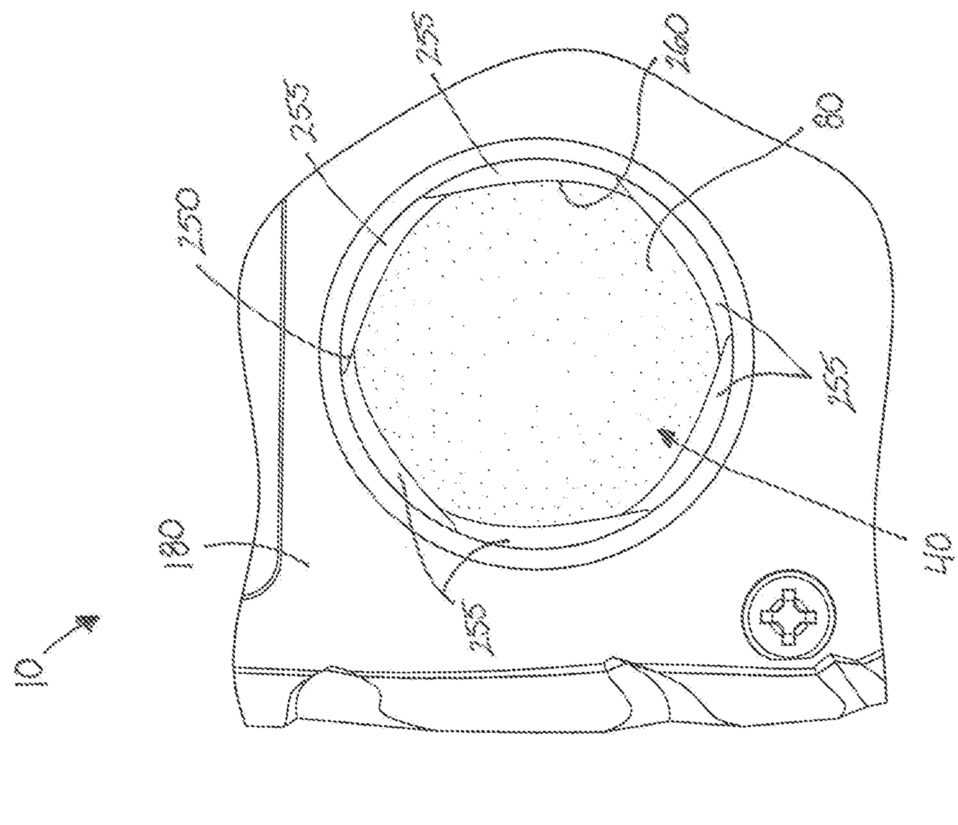
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FIG. 15

AUTOMATED CAMERA ASSEMBLY WITH INFRARED DETECTOR CURTAIN

BACKGROUND

The present invention relates generally to trail cameras and, more specifically, to trail cameras having detectors for determining when to take a picture or video.

Trail cameras (commonly called "trail cams") are used to take pictures or videos of certain subjects, such as wildlife. In order to trigger the camera (e.g., take a picture or start a video), trail cams typically include a detector that detects that a subject is within view of the camera. The detector can detect a variety of variables, such as sound, opacity, geomagnetism, reflection of transmitted energy, electromagnetic induction, and vibration. Most trail cams used today utilize an infrared ("IR") detector for triggering the camera.

On an IR trail cam, the IR detector is positioned to receive radiation from the direction that the camera is pointing. A lens (e.g., a Fresnel lens) can be positioned in front of the IR detector to gather IR radiation and define a field of view. The detector will trigger the camera when a subject is detected in the detector's field of view. Typically, the detector's field of view is the same as the camera's field of vision so that an object sensed by the IR detector is within the field of vision of the camera. When the IR detector senses a change in the IR radiation within the field of view, it sends a signal to activate the camera.

Because the detector's field of view is the same as the camera's field of vision, pictures taken with the above system commonly result in the subject (i.e., the object emitting IR radiation) being positioned on the edge of the picture. In order to solve this problem, some cameras design the detector's field of view to be narrower and centered with respect to the camera's field of view. The result is that the detector does not trigger the camera until the subject is more centered within the camera's field of vision.

SUMMARY

The present invention provides an automated camera assembly comprising a camera (e.g., a digital camera) having a field of vision and a detector for detecting a subject and triggering the camera. The detector has an adjustable field of view and includes a sensor (e.g., an IR sensor) having a maximum field of view, and a curtain for reducing the maximum field of view to an adjusted field of view. The curtain comprises at least two sections (e.g., opaque members) coupled to move together from a first position corresponding with the maximum field of view to a second position corresponding with the adjusted field of view smaller than the maximum field of view. Movement of the curtain relative to the sensor can be linear, pivotal, radial, or any other suitable movement.

The present invention also provides a method of adjusting a field of view of a detector on an automated camera assembly having a camera positioned within a housing. The detector includes a curtain having at least two sections coupled for simultaneous movement, and the method comprises detecting a first subject within a maximum field of view of the detector, triggering the camera after detecting the first subject within the maximum field of view, and adjusting the maximum field of view of the detector to an adjusted field of view of the detector by moving the at least two curtain sections together from a first position corresponding with the maximum field of view to a second position corresponding with the adjusted field of view smaller than the maximum field of view. The method further comprises detecting a second subject within the adjusted field of view and triggering the camera after detecting the second subject within the adjusted field of view. Preferably, the detector comprises a sensor, and the step of adjusting includes moving the at least two curtain members in front of the sensor, such as by linearly sliding, pivoting, or moving radially.

Other aspects of the invention will become apparent by consideration of the detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a camera assembly embodying the present invention.

FIG. **2** is a front view of the camera assembly of FIG. **1** illustrating a housing and a detector having a curtain in a first position.

FIG. **3** is an exploded view of the camera assembly of FIG. **1** illustrating a portion of the housing and the curtain.

FIG. **4** is a front view of the camera assembly of FIG. **2** illustrating the curtain in a second position.

FIG. **5** is a front view of a second embodiment of the present invention including a different curtain shown in a first position.

FIG. **6** is a front view of the camera assembly of FIG. **5** illustrating the curtain in a second position.

FIG. **7** is a front view of a third embodiment of the present invention including a different curtain shown in a first position.

FIG. **8** is a front view of the camera assembly of FIG. **7** illustrating the curtain in a second position.

FIG. **9** is a front view of a fourth embodiment of the present invention including an electronic curtain in a first position.

FIG. **10** is a front view of the camera assembly portion of FIG. **9** illustrating the electronic curtain in a second position.

FIG. **11** is a front view of a fifth embodiment of the present invention including another electronic curtain in a first position.

FIG. **12** is a front view of the camera assembly portion of FIG. **11** illustrating the electronic curtain in a second position.

FIG. **13** is a perspective view of a sixth embodiment of the present invention including another curtain in a first position.

FIG. **14** is a front view of the camera assembly portion of FIG. **13** illustrating the curtain in a second position.

FIG. **15** is a front view of a seventh embodiment of the present invention including another curtain in a first position.

FIG. **16** is a front view of the camera assembly portion of FIG. **15** illustrating the curtain in a second position.

Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways.

DETAILED DESCRIPTION

FIGS. **1-4** illustrate an automated wildlife surveillance system or trail camera assembly **10** that can be attached to a mounting structure (e.g., a tree, a post, etc.). The camera assembly **10** includes a housing **15** that includes a base **20** and a cover **25** that is secured to the base **20**. The housing **15** encloses and supports a camera **30** (e.g., a digital camera), an illumination source **35** (i.e., camera flash), and a detector **40** for taking pictures and/or video (described collectively as media) of subjects (e.g., wildlife). The housing **15** also supports a user interface **45** that has several button switches **50** and a display **55**. The cover **25** has several transparent windows **60** so that the camera **30**, the illumination source **35**, and the display **55** (and optionally, the detector **40**) are protected from the environment while also providing exposure (i.e., a clear line of sight) for the camera **30**, the illumination source **35**, and the detector **40** through the cover **25**. The camera assembly **10** also has electrical and/or electronic connections **65** that provide power to components of the camera assembly **10** and to download the media stored in the camera **30**. As illustrated, a strap closure **70** (e.g., formed of a soft, resilient material) is attached to the housing **15** to enclose the user interface **45** (e.g., to protect the user interface **45** from debris, water, sunlight, rain, etc.) when not in use. As will be appreciated, the camera assembly **10** can include other components (e.g., additional sensors, not specifically discussed herein).

The illustrated detector **40** includes a passive infrared ("PIR") sensor **75** and a lens **80** (e.g., a Fresnel lens). The sensor **75** detects a subject and outputs a signal to a processor **85** in response to detection of the subject. The lens **80** defines a field of view of the detector **40** and focuses infrared radiation generated or reflected by a warm object in the field of view onto the PIR sensor **75**. Generally, the detector **40** has a wide field of view (e.g., approximately 45-180°) to encompass a large area of the environment in front of the camera assembly **10**.

With continued reference to FIGS. **1-4**, the detector **40** also includes a curtain **90** that is movable (e.g., slidable vertically, as shown in FIGS. **1**, **2**, and **4**) between a first position (FIG. **2**) in which the curtain **90** does not cover or block a portion of the lens **80**, and a second position (FIG. **4**) in which the curtain **90** covers or blocks a portion of the lens **80** to adjust the field of view of the detector **40**. The illustrated curtain **90** is U-shaped and has a bridge section **95** that interconnects opaque curtain sections **100**. The curtain **90** is positioned in a recessed area **105** of the cover **25**, and outer edges of the curtain sections **100** slide within channels **110** (FIG. **3**) that are defined in the cover **25** so that the curtain **90** is slidable relative to the cover **25**. As illustrated in FIG. **3**, a detent **115** protrudes into each channel and acts on the curtain sections **100** near the bridge when the curtain **90** is in the second position to hold the curtain **90** in the second position. In other constructions, the cover **25** can be provided without a detent **115** such that general frictional resistance between the cover **25** and the sides of the curtain sections **100** can hold the curtain **90** in place. The curtain **90** also optionally has a projection or guide post **120** along a backside of the curtain **90** that engages a slot **125** in the cover **25** within the recessed area **105** to guide movement of the curtain **90** between the first position and the second position. The guide post **120** and the slot **125** also cooperatively inhibit removal of the curtain **90** from the cover **25** absent a user's desire to do so.

FIGS. **1** and **2** show the curtain **90** in the first position (a storage position) in which the curtain sections **100** do not cover the lens **80** such that the detector **40** has a predetermined wide field of view. As shown in FIG. **3**, the bridge section **95** has a higher profile than the curtain **90** protections so that a user can easily grasp the curtain **90** to move the curtain **90** between the first position and the second position. FIG. **4** illustrates the curtain **90** in the second position in which the curtain sections **100** cover laterally opposite sides of the lens **80** such that the detector **40** has a narrow field of view (e.g., 5-45°). That is, the curtain sections **100** narrow the area in front of the camera assembly **10** in which the sensor **75** can detect infrared light. As a result, the PIR sensor **75** can only receive infrared light through the lens **80** between the curtain sections.

A user can adjust the field of view of the detector **40** from the wide field of view to the narrow field of view by sliding the curtain **90** from the first position to the second position so that the curtain sections **100** cover **25** the side areas of the lens **80**. In the second position, only the center area of the lens **80** focuses light onto the PIR sensor **75**. In addition to visual cues, the user can determine that the curtain **90** has reached the second position because the detent **115** will no longer act on the sides of the curtain sections **100** (i.e., the frictional resistance caused by the detent **115** ceases when the curtain **90** reaches the second position). As illustrated, the distance that the curtain **90** moves within the recessed area **105** between the first position and the second position is relatively small (e.g., less than approximately 1 inch), although the distance can change depending on the design of the camera assembly **10**.

The width of the curtain sections **100** determines the width of the field of view for the detector **40**. The illustrated curtain **90** is removable from the cover **25**, so that the field of view of the detector can be modified, if desired, by replacing the curtain **90** with another curtain **90** that has wider or narrower curtain sections **100**. To remove the curtain **90**, a user gently lifts the bridge section **95** to disengage the guide post **120** from the slot **125**, and then slides the curtain **90** along the channels **110** (downward as viewed in FIGS. **2** and **4**) until the curtain sections **100** are disengaged from the cover **25**. The user can then insert another curtain **90** into the recessed area **105** by sliding the curtain sections **100** of the new curtain **90** into the channels **110** until the guide post **120** engages the slot **125**.

FIGS. **5** and **6** illustrate a second embodiment of the curtain. For ease of reference, the same camera is illustrated and referenced for all embodiments of the curtain, with only a slight change in the cover. The illustrated camera assembly **10** includes a different cover **130** and a pair of curtains **135** that are movable between respective first positions in which the curtains **135** do not cover or block a portion of the lens **80**, and respective second positions in which the curtains **135** cover or block a portion of the lens **80** to adjust the field of view of the detector **40**. In particular, the cover **130** has recessed areas **140** on opposite sides of the detector **40** to accommodate the curtains **135** so that either or both of the curtains **135** can slide between the first positions and the second positions to adjust the field of view for the detector **40**.

Each of the illustrated curtains **135** is rectangular and includes a user-engagement section **145** and an opaque curtain section **150**. The user-engagement section **145** has a raised profile so that a user can manipulate the curtain **135** between the first and second positions. Like the curtain sections **100** described with regard to FIGS. **1-4**, outer edges of the curtain sections **150** are disposed in channels (not shown) that are defined in the cover **130** so that the curtain **135** is slidable relative to the cover **130**. The cover **130** also can include a detent (not shown) to act on the curtain sections **150** when the curtain **135** is in the second position to resist movement of the curtain **135** from the second position. Also, each curtain **135** can have a guide post (not shown), similar to the guide post **120** described relative to FIGS. **1-4**, that is disposed along the underside to engage a corresponding slot **155** in the cover **130** to guide movement of the curtain **135** between the first position and the second position. The guide post and the slot **155** function similarly to the guide post **120** and the slot **155** described with regard to FIGS. **1-4**, and as such, will not be described in detail.

FIG. **5** illustrates the curtains **135** in the first position (a storage position) in which the curtain sections **150** do not cover the lens **80** such that the detector **40** has a predetermined wide field of view. FIG. **6** illustrates the curtains **135** in the second position in which the curtain sections **150** cover laterally opposite sides of the lens **80** such that the detector **40** has a narrow field of view. That is, the curtain sections **150** narrow the area in front of the camera assembly **10** in which the sensor **75** can detect and respond to infrared light.

As will be appreciated, the curtains **135** illustrated in FIGS. **5** and **6** can slide together or independently relative to each other within the recessed areas **140** to modify the field of view for the detector **40**. For example, when movement of one curtain **135** depends on movement of the other curtain **135**, both curtains **135** slide simultaneously between the first position and the second position in response to manipulation of one of the curtains **135**. When each curtain **135** is independently movable, a user can manipulate either the left curtain **135** or the right curtain **135** between the first position and the second position to adjust the field of view for the detector **40** without also moving the other curtain **135**. Moreover, a user can manipulate independently movable curtains **135** consecutively or simultaneously between the first and second positions. More generally, the field of view for the detector **40** can be stepwise or continuously adjusted from the widest field of view provided to the narrowest field of view available by sliding one or both of the curtains **135** a desired amount. In this regard, this second embodiment of the curtain is infinitely variable between the first position and the second position.

A user can adjust the detector **40** from the wide field of view by sliding one or both curtains **135** from the first position toward or to the second position so that the corresponding curtain sections **150** cover the side areas of the lens **80**. As a result, only the center area of the lens **80** focuses light onto the PIR sensor **75**. Because the illustrated curtains **135** are oriented to slide horizontally between the first and second positions, a detent is not necessary to hold the curtains **135** in the desired position. The distance that the curtains **135** move within the recessed areas **140** between the first position and the second position is relatively small (e.g., less than approximately 1 inch).

FIGS. **7** and **8** illustrate a third embodiment of the curtain, where the camera assembly **10** includes a different cover **160** and another pair of curtains **165** that are movable between respective first positions in which the curtains **165** do not cover or block a portion of the lens **80**, and respective second positions in which the curtains **165** cover or block a portion of the lens **80** to adjust the field of view of the detector **40**. More specifically, each of the illustrated curtains **165** is disposed in a recessed area **170** of the cover **160** and is pivotable (e.g., like shutters) about a corresponding pivot **175** between the first position and the second position. The curtains **165** have opaque curtain sections that are manipulatable by a user to adjust the field of view for the detector **40**.

FIG. **7** illustrates the curtains **165** in the first position such that the detector **40** has a predetermined wide field of view. FIG. **8** illustrates the curtains **165** pivoted to the second position to cover laterally opposite sides of the lens **80** such that the detector **40** has a narrow field of view in which the PIR sensor **75** can only receive and respond to infrared light through the lens **80** between the curtains **165**.

The curtains **165** are independently movable between the first and second positions so that one or both sides of the lens **80** can be covered. The independently movable curtains **165** provide stepwise or continuous adjustment of the field of view for the detector **40** between the widest field of view provided and the narrowest field of view available by pivoting one or both of the curtains **165** to cover as much or as little of the lens **80** as desired. In particular, a user can adjust the field of view of the detector **40** from the wide field of view to a narrower field of view by pivoting one or both curtains **165** from the first position toward or to the second position so that the corresponding curtain sections **180** cover at least some of the side areas of the lens **80**. As a result, only the central area of the lens **80** focuses light onto the PIR sensor **75**. Like the curtains **165** described with regard to FIGS. **1-6**, the illustrated curtains **165** are removable from the cover **160** so the narrow field of view can be modified, if desired, by replacing the curtains **165** with wider or narrower curtains **165**.

FIGS. **9** and **10** illustrate a fourth embodiment of the curtain. In this embodiment, the camera assembly includes a different cover **180** and an electronic or digital curtain **185** for the camera assembly **10**. The digital curtain **185** can be formed as part of the sensor **75**, provided as a separate component disposed between the sensor **75** and the lens **80**, or be incorporated into the control logic of a digital processor (e.g., the processor can selectively ignore signals form certain pixels). In some constructions, the camera assembly **10** can be provided without a separate lens **80** (e.g., the lens **80** can be incorporated into the sensor **75**, or not provided at all). As illustrated, the digital curtain **185** has a digital pixel array **190** that surrounds the center of the sensor **75** and that is variable between a first position (e.g., an "on state") in which the detector **40** has a wide field of view, and a second position (e.g., an "off state") in which the detector **40** has a narrow field of view. The pixel array **190** has a plurality of pixels **195** concentrically arranged around the center of the sensor **75**, which remains exposed to the environment surrounding the camera assembly **10** regardless of the state of the pixel array **190**.

FIG. **9** shows the detector **40** with the pixel array **190** in the on state (i.e., the detector **40** has the wide field of view). More specifically, all of the pixels **195** are in the on state such that the sensor **75** responds to infrared light detected by any of the pixels **195** (i.e., the detector **40** has a wide field of view) or by the center, non-pixilated area of the sensor **75**. If desired, some or all of the pixels **195** can be varied to the off state so that the detector **40** has a narrower field of view by manipulating a button or switch (not shown) on the housing **15**. Generally, the quantity of pixels **195** that are in the off state determines how narrow the field of view will be for the detector **40**. FIG. **10** shows the detector **40** with some of the pixels **195** in the off state (illustrated as grayed-out in FIG. **10**) such that the detector **40** has a narrow field of view (i.e., only the center area of the sensor **75** and the vertically-centered pixels **195** receive and respond to infrared light). Depending on the level of control provided in the camera assembly **10**, one or more of the pixels **195** can be individually or collectively varied (using corresponding controls or switches on the camera assembly **10**) between the on and off states to achieve the desired field of view for the detector **40**.

FIGS. **11** and **12** illustrate a fifth embodiment of the curtain. Like the fourth embodiment, the fifth embodiment is another electronic or digital curtain **200** for the camera assembly **10**. Like the digital curtain **185** described with regard to FIGS. **9** and **10**, the digital curtain **200** shown in FIGS. **11** and **12** can be formed as part of the sensor **75**, provided as a separate component or layer disposed between the sensor **75** and the lens **80** (e.g., on the surface of the sensor **75**), or be incorporated into the control logic of a digital processor (e.g., the processor can selectively ignore signals form certain pixels). Likewise, the camera assembly **10** can be provided without a separate lens **80** (e.g., the lens **80** can be incorporated into the sensor **75**, or not provided at all).

As illustrated, the digital curtain **200** has a digital pixel array **205** with a plurality of pixels **210** arranged in a matrix across the sensor **75**. Each pixel **210** can be varied (individually or collectively with at least some of the remaining pixels **210**) between a first position (e.g., an "on state") and a second position (e.g., an "off state") to adjust the field of view for the detector **40**. When all of the pixels **210** are in the on state, the detector **40** has a wide field of view. In other words, the sensor **75** receives and responds to infrared light detected by any of the pixels **210**. When one or more pixels **210** are in the off state, the detector **40** will have a narrower field of view (i.e., a field of view that is smaller than the wide field of view) such that the sensor **75** only responds to infrared light detected by the pixels **210** in the on state.

FIG. **11** shows the detector **40** with all of the pixels **210** in the on state (i.e., the detector **40** has the wide field of view). If desired, a user can vary some or all of the pixels **210** to the off state so that the detector **40** has a narrower field of view by manipulating a button or switch (not shown) on the housing **15**. FIG. **12** shows the detector **40** with pixels **210** on opposite sides of the sensor **75** (left and right sides as viewed in FIG. **12**) in the off state (illustrated as grayed-out in FIG. **12**) such that only the centrally located pixels **210** are in the on state and respond to infrared light, thus narrowing the detector's field of view. Depending on the level of control provided in the camera assembly **10**, individual pixels **210** or groups of pixels **210** can be varied between the on and off states to achieve the desired field of view for the detector **40**.

FIGS. **13** and **14** illustrate a sixth embodiment of a curtain **220** for the camera assembly **10**. The camera assembly **10** includes the cover **25** (or a similar cover) and the recessed area **105**, and the curtain **220** is movable between a first position (FIG. **13**) in which the curtain **220** does not cover or block a portion of the lens **80**, and a second position (FIG. **14**) in which the curtain **220** covers or blocks a portion of the lens **80** to adjust the field of view of the detector **40**. More specifically, the illustrated curtain **220** is disposed in the recessed area **105** of the cover **160** and has a flange **225** that slides within the channels **110** between the first position and the second position.

The curtain **220** is further defined by a cylindrical body **230** extending outward from the flange **225**. The cylindrical body **230** has a hollow central shaft **235** and an opaque curtain section **240** disposed concentrically about the central shaft **235** (i.e., the radially inward surface of the curtain section **240** defines the central shaft **235**). The central shaft **235** passes completely through the body **230** and the flange **225** so that some infrared light can still reach the PIR sensor **75**. The central shaft **235** has a predetermined width or diameter that determines the field of view of the detector **40**.

FIG. **13** illustrates the curtain **220** in the first position such that the detector **40** has a predetermined wide field of view. FIG. **14** illustrates the curtain **220** slid to the second position to cover the outermost radial portion of the lens **80** such that the detector **40** has a narrow field of view in which the PIR sensor **75** can only receive and respond to infrared light through the lens **80** directed along the central shaft **235**. The curtain **220** is movable between the first and second positions so that the detector has the predetermined wide field of view (determined based on the field of view of the lens **80**), or a narrow field of view (determined by the width of the central shaft **235**). A user can adjust the field of view of the detector **40** from the wide field of view to a narrower field of view by moving the curtain from the first position to the second position. In the second position, only the central area of the lens **80** focuses light onto the PIR sensor **75**. Like the curtains **165** described with regard to FIGS. **1-8**, the illustrated curtain **220** is removable from the cover **160** so the narrow field of view can be modified, if desired, by replacing the curtain **220** with a wider or narrower curtain **220**.

FIGS. **15** and **16** illustrate a seventh embodiment of a curtain **250** for the camera assembly **10**. The camera assembly **10** includes the cover **180** described with regard to FIGS. **9-12**. The curtain **250** has a plurality of overlapping, opaque blades **255** arranged around the perimeter of the lens **80** to form a mechanical aperture **260** at the center of the blades **255**. The blades **255** are adjustable between a first position in which the curtain **250** does not cover or block a significant portion of the lens **80**, and a second position in which the curtain **250** covers or blocks a significant portion of the lens **80** to adjust the field of view of the detector **40**. The PIR sensor **75** is not shown in FIGS. **15** and **16** for clarity.

The curtain **250** can be a mechanical or electro-mechanical device that moves the blades **255** generally radially inward and radially outward to adjust the size of the aperture, and thus the amount of light passing through the lens **80**. For example, movement of the blades can be accomplished mechanically by twisting or rotating a knob on the cover **180** or electrically or electronically via a control on the cover **180** (e.g., a pushbutton on the cover **180**). The blades **255** can be continuously or step-wise movable between the first position and the second position to achieve a desired aperture size corresponding to a desired field of view.

FIG. **15** illustrates the curtain **250** in the first position such that the detector **40** has a predetermined wide field of view. FIG. **16** illustrates the curtain **250** with the blades **255** moved radially inward toward the second position to cover the outermost radial portion of the lens **80** such that the detector **40** has a narrow field of view through the aperture **260**. In the position illustrated in FIG. **16**, the PIR sensor **75** can only receive and respond to infrared light through the lens **80** directed through the aperture **260**.

The detector **40** triggers the camera **30** to take a picture or start a video when the PIR sensor **75** detects and responds to infrared light (or a change in infrared light) within the field of view of the detector **40**. More specifically, the processor **85** receives information from the sensor **75** regarding the position of the subject within the maximum field of view provided by the detector **40**, and is programmed to actuate the camera **30** when the subject is within the field of view. The adjustable field of view for the detector **40** allows a user to selectively choose a wide field of view to capture a subject anywhere in the camera's field of vision, or a narrower field of view to capture a subject closer to the center of the camera's field of vision. While specific examples of mechanical and electronic or digital curtains are discussed in detail with regard to FIGS. **1-16**, is should be appreciated that other curtains can be used to selectively narrow the field of view of the detector **40**.

With regard to the curtains described with regard to FIGS. **1-8** and **13-16**, when the curtain **90**, **135**, **165**, **220**, **250** is in the first position, the field of view of the detector **40** is the same as the camera's field of vision. When the curtain **90**, **135**, **165**, **220**, **250** is moved to the second position, the field of view of the detector **40** is narrower than the camera's field of vision so that the media taken with the camera assembly **10** will more likely show the subject centered on the media. A narrower field of view for the detector **40** also will be more likely to accurately and completely capture the subject in the media. Moreover, a user can manipulate the curtain **90**, **135**, **165**, **220**, **250** to adjust the field of view as desired.

With regard to the digital curtains described with regard to FIGS. **9-12**, in some constructions the pixels **195**, **210** that are in the off state may receive infrared light emanating from the environment. In these constructions, the processor **85** receives information from the sensor **75** regarding the position of the subject within the maximum field of view (i.e., the widest field of view provided for the detector **40**) in response to any pixel **195**, **210** detecting infrared light. However, the processor **85** in these constructions is programmed to trigger the camera **30** only when the subject is within the adjusted field of view that is narrower than the maximum field of view. In other words, the detector **40** recognizes a subject that is in the wide field of view and communicates this recognition to the processor **85**, but the processor **85** does not trigger the camera **30** until at least one of the pixels **195**, **210** that is in the on state (or the center area of the sensor **75** of FIGS. **9** and **10**) receives and responds to infrared light. Thus, the processor does not trigger the camera **30** when a pixel **195**, **210** in the off state receives to infrared light.

Various features and advantages of the invention are set forth in the following claims.

The invention claimed is:

1. An automated camera assembly comprising:
a camera having a field of vision; and
a detector for detecting a subject and triggering the camera, the detector including an adjustable field of view, wherein the detector includes:
a sensor having a maximum field of view; and
a curtain for reducing the maximum field of view to an adjusted field of view, wherein the curtain comprises at least two sections coupled to move together from a first position corresponding with the maximum field of view to a second position corresponding with the adjusted field of view smaller than the maximum field of view; wherein the at least two sections are positioned on opposing sides of the sensor in the second position.

2. An automated camera assembly as claimed in claim **1**, wherein the camera is a digital camera.

3. An automated camera assembly as claimed in claim **1**, wherein the detector includes an infrared sensor.

4. An automated camera assembly as claimed in claim **1**, wherein the curtain sections comprise opaque members movable relative to the sensor.

5. An automated camera assembly as claimed in claim **4**, wherein the curtain is mounted for linear movement relative to the sensor.

6. An automated camera assembly as claimed in claim **4**, wherein the curtain is mounted for pivotal movement relative to the sensor.

7. An automated camera assembly as claimed in claim **4**, wherein the curtain is mounted for radial movement relative to the sensor.

8. A method of adjusting a field of view of a detector on an automated camera assembly having a camera positioned within a housing, the detector including a curtain having at least two sections coupled for simultaneous movement, the method comprising:
detecting a first subject within a maximum field of view of the detector;
triggering the camera after detecting the first subject within the maximum field of view;
adjusting the maximum field of view of the detector to an adjusted field of view of the detector by moving the at least two curtain sections together from a first position corresponding with the maximum field of view to a second position corresponding with the adjusted field of view smaller than the maximum field of view; wherein the detector comprises a sensor, and wherein adjusting includes positioning the two curtain members on opposing sides of the maximum field of view to partially block the maximum field of view;
detecting a second subject within the adjusted field of view; and
triggering the camera after detecting the second subject within the adjusted field of view.

9. A method as claimed in claim **8**, wherein moving comprises linearly sliding the curtain members relative to the sensor.

10. A method as claimed in claim **8**, wherein moving comprises pivoting the curtain members relative to the sensor.

11. A method as claimed in claim **8**, wherein the automated camera assembly further includes a processor that receives information from the detector regarding the position of the subject within the maximum field of view and triggers the camera when the subject is within an adjusted field of view less than the maximum field of view.

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